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AUTHOR Beck, Isabel L.; And Others
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ABSTRACT

Designed to improve reading comprehension and other complex verbal functions, fertile instruction in word skill focuses on improving accuracy of word knowledge, increasing fluency of access to meanings in memory, and enriching semantic network connections among related concepts. It is particularly appropriate for teaching the high frequency words of mature language users to less skilled readers. In a program for less skilled readers in the fourth grade, semantic groups of about 10 words were presented over one-week periods. Instruction included a range of tasks from matching words with definitions to using words in new contexts and contrasting words to discover new relationships. The program also motivated children to carry their vocabulary learning beyond the classroom. Three studies of instructional effects revealed that (1) children gained an accurate knowledge of word definitions as measured by a multiple choice test, (2) children were able to access instructed words faster in word categorization tests, and (3) students receiving rich instruction outperformed those with more traditional instruction on a word context task. Finally, recall and multiple choice questions showed that students receiving fertile instruction had improved reading comprehension for stories with instructed words. (MM)

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The Fertility of Some Types of Vocabulary Instruction

Isabel L. Beck

Margaret G. McKeown

Richard C. Omanson

University of Pittsburgh

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The title of this symposium is "What is the role of instruction in learning and using vocabulary?" Before formulating an answer to this question, one must decide what "learning vocabulary" means and what its relation to "using vocabulary" is. One approach to this has been to consider only the learning of vocabulary. In this case, the criterion for having learned vocabulary is straight forward and consists of the ability to associate a word with its definition or synonym. A rather different approach is to consider not only the learning of vocabulary, but also the use to which vocabulary will be put, such as using words to interpret the meaning of sentences and to comprehend texts. In this case the notion of "learning" vocabulary becomes multi-faceted.

The work I will discuss today has been from the latter approach and has resulted in what we call "fertile" instruction. To describe why we consider this type of vocabulary instruction as "fertile," we will focus on three characteristics, the aspects of vocabulary knowledge and use that our instruction is aimed to enhance, the types of words that are the candidates for instruction under this approach, and the population of learners for whom the instruction is targeted.

Regarding aspects of vocabulary knowledge, we have hypothesized that the semantic processes involved in reading comprehension require accuracy of word knowledge, fluency of access to meanings in memory, and rich semantic network connections among related concepts. In order to influence reading comprehension, and other complex verbal functions, instruction must improve all three of these processing components. Toward this end, it should aim at an exploration of each word's meaning and related ideas to yield a deep knowledge of words.

The instruction we developed was not intended to be appropriate for all types of words. To elaborate, consider a mature, literate individual's vocabulary as comprising three tiers. The first tier consists of the most basic words--***cat***, ***mother***, ***go***, ***red***, ***talk***, ***chocolate***, etc. It would be difficult to argue that any direct instruction be devoted to the meanings of these words in school. The **third** tier consists of words whose frequency of use is quite low, or which apply to specific domains. This tier might include words such as ***divertimento***, ***nebula***, ***resistivity***, ***nonrestrictive***,

and *tidal pool*. In general, a rich conceptual knowledge of such words would not be of high utility for most learners. These words are probably best learned when a specific need arises, such as presenting *nebula* during a lesson or discussion of the solar system.

Now, to return to the second tier. It is this tier which contains words of high frequency for mature language users. They are also words of general utility, not limited to a specific domain. Some examples might be *unique*, *convenient*, *retort*, *influence*, *ponder*, and *procrastinate*. It is words of this type toward which the most productive instructional efforts can be directed. Because of the role they play in a language user's verbal repertoire, rich knowledge of words in this second tier can have a significant impact on verbal functioning.

It is difficult to get a handle on how many words or what percentage of a vocabulary repertoire would be included in this second tier. We have made an initial attempt to estimate it as follows, using data from Nagy & Anderson's (in press) analysis of words in printed school English for grades 3 to 9: Nagy & Anderson estimate that good readers of this age range may read a million words of text a year. They also estimate that about half of the 88, 500 word families they calculate to exist in printed school English are so rare that they may be encountered no more than once in an avid reader's lifetime. With these figures in mind, it seems reasonable to consider words--or, rather, word families--that would be encountered once in ten years, namely those that occur once or more in ten million running words of text, as comprising tiers one and two. That translates into about 15,000 word families. A stab at estimating tier one, those most familiar words that need no instruction, would be 8,000 word families. We have chosen this figure because Nagy & Anderson state that it may be reasonable to assume that a third-grader already knows 8,000 words. That gives us about 7,000 word families for tier two, which we want to focus on. Based on a new study just completed which lowered the frequency of the words taught, we estimate that the number of words that could be taught, in a rich way, per school year is about 400. Teaching 400 words per year over grades three to nine, would provide rich knowledge for 40% of the word families that make up tier two.

This estimate must be presented with a cautionary note; it is only an attempt to get a handle on a possible figure for the words we would focus on. No degree of precision can be assumed. Yet, it is useful for making two important points. First, nowhere near all the words that are available in print or oral contexts would be candidates for the kind of instruction we have in mind. Second, providing rich conceptual networks for a portion of words that would be good candidates -- approximately 40% of them -- is a significant contribution to the verbal functioning of an individual.

The significance of this contribution is particularly apparent in light of the third characteristic of our approach, our target population of learners. The kind of instruction we favor is particularly targeted for those children in the lower half of the distribution in both reading skill and SES. For example, in our original vocabulary study, the subjects were 4th graders from a city school, and 79% of them were below the 50th percentile on standardized pre-tests in reading comprehension and vocabulary. It is this type of child who is less likely to acquire, and become proficient in using, rich conceptual networks of tier two words independently. We base this statement on two sets of evidence, and a conjecture.

The first set of evidence about richness of vocabulary knowledge comes from work by Curtis and Glaser (in press). They found that students of lower ability knew not only fewer words, but had more narrow knowledge of words with which they were familiar.

The other evidence and the conjecture are concerned with the issue of how the acquisition and proficient use of rich vocabulary knowledge might develop without specific in-school instruction. One way is through extensive reading, where familiar words are encountered in new and varied contexts and each new context is a potential new facet of that word's network. However, the children we are talking about are the less able readers. Not only are these children less likely to read extensively, but evidence shows that they are not particularly facile in deriving word meaning information from context (McKeown, 1983; Quealy, 1969; Rankin & Overholser, 1969; Sternberg, Powell, & Kaye, in press).

Another way rich networks might develop is through manipulating and experimenting with words in reflective, playful, and novel ways. Our conjecture is that these kinds of experiences with language are not commonly in the repertoire of our target children; such aspects of language use are not part of their verbal environment at home or among peers.

From the three characteristics of our approach just presented, a role for vocabulary instruction can be derived. That role is to increase not only knowledge of word definitions, but to provide a variety of semantic links to words and greater facility in using words. Thus the question that must be addressed is whether instruction can fulfil this role. From the three studies we have done, we have evidence that the instruction we created did so. Now I will outline the instruction and the evidence of its success.

The instruction we used in the three studies presented words in semantic groups of 8-10 words. For example, one labeled *Moods* included ***jovial***, ***indignant***, and ***enthusiastic***. Each set of words was taught over about a week's time, in which the activities grew more challenging each day. The instruction was designed to include a range of task requirements that encompassed, but went well beyond, matching words with definitions. Activities included associating new words with contexts that did not contain definition elements, but presented consequences, examples, or typical actions associated with the taught words. Children were sometimes asked to create contexts for words, such as discuss what a ***tyrant*** might have a nightmare about, or describe a time when they had ***consoled*** someone. Another type of activity involved comparing and contrasting words to discover relationships, such as answering, "Would you ***berate*** someone who ***inspired*** you?" or "Would you want to ***baffle*** someone who tried to ***snare*** you?" Our rationale was that requiring students to manipulate words in varied and rich ways would produce a deeper understanding of the words and more flexibility in using the words. The activities were mostly whole class, and provided for a great deal of discussion and interaction around the words.

Another component of the instruction was an activity to motivate the children to carry their vocabulary learning beyond the classroom. In this activity, called ***Word Wizard***, children

could earn points toward becoming a word wizard by reporting the context in which they had seen, heard, or used an instructed word outside of class. The purpose of the word wizard activity was to provide extrinsic motivation for children to extend their learning of the words presented in the program to nonschool activities.

How successful was this instruction? The goals of the instruction were to produce word skill that was rich and proficient enough to facilitate complex verbal tasks such as reading. There are many aspects of word skill that are important. The ones we focused on in these studies were: (1) accurate knowledge of word meanings; (2) accessibility of word meanings during processing; (3) richness in semantic network connections. Before I present the evidence about the success of the instruction, let me remind you that our subjects were 4th graders from a city school, approximately 80% of whom were below grade level in reading ability.

In these studies, we found, first, that children gained an accurate knowledge of the definitions of the words taught as measured by multiple choice tests. On mastery tests given at the completion of each week's instruction, the children knew about 95% of the instructed words. On a posttest given three weeks after all instruction had been completed, they still knew 80% of the words.

Second, as a result of the instruction, the children were able to access instructed word meanings faster as measured by their reaction time on word categorization tasks. That is, children were shown a word on a screen and asked to press a *yes* or *no* button to indicate if the word was, for example, "a person." This result suggests that the words were learned well enough to be readily available for complex processing tasks.

The third measure was a task designed to assess richness of semantic network connections, in contrast to a simple link between a word and definition. Here, children who received rich instruction were compared to children who received instruction of a more traditional type that focused only on associations between words and definitions. And, by the way, the data on this third measure come from a study just completed, which hasn't been reported in the literature yet.

The task is based on a problem that young learners sometimes exhibit in being unable to integrate a word's meaning into the surrounding context to develop an appropriate representation of the context as a whole (McKeown, 1983). Such a problem is particularly apparent when the surrounding context does not strongly call to mind the target word. For example, consider the following scenario containing the instructed word ***commend***: ***When father heard that Lisa had ripped up the letter from Steve, father commended her for it.*** One does not usually think of being commended for destroying something in anger.

The task we presented consisted of scenarios such as the ***commend*** one, followed by a question that required an understanding of the implications of the target word within the context. The question for the ***commend*** scenario was "What do you think father thought of Steve?" To answer this question, one must infer that father approved of Lisa's action, and, therefore, must not think much of Steve.

Children who received the rich instruction were better able to respond to the questions that followed the scenarios. One tendency for children who received the narrow instruction was to react by defining the target word rather than responding to the situation presented. This suggests they did not have readily available a network of associations for the target word which they could draw upon in establishing an interpretation of the situation.

Given that the instruction enhanced accuracy, fluency, and richness of word skill, one might expect that reading comprehension would be improved for stories containing instructed words. This was indeed the case as measured by recall and answers to multiple choice questions. Thus, not only did children show improvement in specific components of vocabulary skill that are likely prerequisites of more complex tasks such as reading, they also showed improvement in reading comprehension itself.

What we have presented is one possible role for instruction. The point we would like to make about this role is that in order to foster this type of skill, instruction needs to attend to various components of word skill directly. This is particularly important for less-skilled readers

because the habits and reading environments of these children are less likely to result in a satisfactory level of verbal performance without instruction. There are obviously other possible roles for instruction than the one outlined here. However, the need filled by being skilled in using words in the second tier is an important one and for many children may be met only through carefully crafted, multi-faceted instruction.

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